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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,586

03/12/2004

Edward J. Nowak

BUR920030159US1

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11/30/2004

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/708,586

Applicant(s)

NOWAK, EDWARD J.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. Claims 15-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 10, 2004.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter of a straining layer structure that can be strained on one of the two transistor and relaxed on the other of the two as recited in claims 6 and 13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In addition, a same numeral of "21" in Figs. 2E and 2F appears to refer two different layers (see Paragraph 0045).

Inconsistencies apparently exist among Figs. 2E-2G regarding layers 21, 23 and 30.

A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities and/or defects:

In Paragraph [0054], line 3, the term of "21" should read as: --23--.

Appropriate correction is required.

Claim Objections

4. Claims 3 and 10 are objected to because of the following informalities: and/or defects:

Claims 3 and 10 each recite the term of "a gate", but fails to clarify it is for which of the two recited FETs and is located between which FET's S/D regions.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2, 3, 6, 9, 10 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matters which were not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims recite the subject

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matters that the recited straining layer is formed over the recited transistors with the recited silicide layer therebetween, and/or that the straining layer is strained on one side, yet relaxed on the other side. However, the disclosure lacks an adequate description regarding these subject matters, especially regarding what is the structure/material set for the recited straining layer; and how such a straining layer could still have the desired straining effect on the underlying transistors if they are separated by the silicide layer, which is normally formed through an annealing process and tends to relax the underlying S/D regions and gate electrode.

And, it is also not clear how a single straining layer such as layer 23 as shown in Fig. 2G of the instant invention can be strained on one side while relaxed on the other side, given that the structure and material set for the two transistors in Fig. 2G are substantially the same.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14, insofar as in compliance with 35 U.S.C. 112 and as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being obvious over Yeo et al. ("Yeo"; US 2004/0195646 A1) in view of Ge et al. ("Ge"; US 2004/0195623 A1) and/or Wang et al. ("Wang"; US 6,657,223).

Yeo discloses a CMOS-type integrated circuit structure (especially in Figs. 2a and 9b), comprising: a substrate (170) having at least two types of crystalline orientations ((100) in region 110 and (110) in region 112); and, nMOSFET (122) and pMOSFET (124) formed respectively thereon.

Although Yeo does not expressly disclose that a straining layer can be formed atop the two MOSFETs and/or that a silicide layer can be formed in part of each of the source/drain regions and the gate electrodes of the two MOSFET, one ordinary skill in the art would readily recognize that such a straining layer can be desirably formed for improving the performance of the underlying transistor(s), as evidenced in Ge (see the straining layer 44 in the cover page figure), and/or that such silicide regions are commonly formed in the art for reducing the connection resistance, as evidenced in Wang (see the silicide regions 22 and 26 in Fig. 2).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporate the silicide regions of Wang and/or the straining layer of Ye into the circuit structure of Yeo, so that a CMOS device with improved connection resistance and/or improved MOSFET performance would be obtained.

Regarding claims 5 and 12, the substrate in Fig. 9b of Yeo is non-floating type on the right side, and floating type on the left side.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH

November 24, 2004



SHOUXIANG HU
EXAMINER